

SIGNALIZED INTERSECTION SAFETY STRATEGIES



U.S. Department
of Transportation
**Federal Highway
Administration**

Revise Geometry of Complex Intersections

WHERE TO USE

Signalized intersections with high levels of crashes on a leg where other low-cost strategies have not been successful or are not considered appropriate.



Photo by: Texas Transportation Institute

In this photo, the photographer's vehicle is in the through lane. Note that it is aligned with the opposing left turn lane requiring a shift to the right when traveling through the intersection.

DETAILS

Some geometric problems with signalized intersections will not be remedied using signing, channelization, or signal phasing. Physical modifications to all or part of an intersection may be needed to reduce severe crash rates. There may be multiple problems associated with one or more movements at the intersection that can be best addressed with significant improvements to intersection design. Because of the extensive reconstruction required to implement these strategies, they will not be appropriate for agency programs designed for quick, low-cost action.

For some signalized four-leg intersections with very low through volumes on the cross street, the best method of improving safety may be to convert the intersection to two T intersections. The intersections should be separated enough to ensure the provision of adequate turn-lane channelization on the major road. If through volumes are high, the intersection may be safer if left as a conventional four-leg intersection. Converting it to two T intersections would only create excessive turning movements at each of the T intersections.

For some signalized offset T intersections with very high through volumes on the cross street, the best method for improving safety may be to convert the intersection to a single four-leg intersection.

Roads that intersect with each other at angles less than 90 degrees can present sight distance and operational problems for drivers. A high incidence of right-angle crashes, particularly involving vehicles approaching from the acute angle, may be the result of a problem associated with skew. Vehicles have a longer distance to travel through the intersection, and drivers may find it difficult to turn their heads and necks to view an approach on an acute angle.



Skewed intersections (with the angle of intersection less than 75 degrees) pose particular problems for older drivers. A restricted range of motion reduces the older drivers' ability to effectively scan to the rear and sides of their vehicles to observe blind spots. They may also have trouble identifying gaps in traffic when making a left turn or safely merging with traffic when making a right turn.

Other techniques to consider are: removing deflection in the through-vehicle travel path, redesigning the intersection approach, and closing the intersection leg.

KEY TO SUCCESS

The key to success for a project of this type is conducting an adequate system traffic study to ensure that the safety and other operational problems are not merely transferred from the intersection being treated to other locations.

ISSUES

Diverted traffic may contribute to safety or operational problems at adjacent intersections or on alternative routes, resulting in no net benefit. Owners of properties where access would be reduced, especially owners of commercial operations, may oppose this strategy.

Care should be taken during the transition period, both before and after the intersection leg is closed, to alert drivers to the changes as they approach the section involved.

Design solutions—including mountable curbs and vegetation or other barriers that can be driven through or over in an emergency—may need to be considered.

TIME FRAME ●●●●

This strategy will likely require an implementation time of at least one year to provide time to work out the details of street closure and to communicate the plan to affected business owners and residents.

COSTS ●●●●●

Costs to implement this strategy are highly variable. Where mere closure of an intersection leg is all that is needed, costs are low, especially if the closure will be implemented with barricades or other low-cost devices. In other cases, modifications to the intersection may require substantially higher expenditures.

EFFECTIVENESS

TRIED/PROVEN: Determination of the effectiveness is site specific, due to the varying conditions at intersections where these strategies may be employed. One study in 1976 indicated offset intersections had crash rates approximately 43% of the crash rates at comparable four-leg intersections.

COMPATIBILITY

These strategies are generally compatible with other signalized intersection safety strategies, and are primarily appropriate for urban and suburban intersections where reasonable alternative access or routes are readily available.

For more details on this and other countermeasures: <http://safety.transportation.org>

For more information contact:

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